

Remarks

I. Status of claims

Claims 1-24 are pending.

II. Claim rejections under 35 U.S.C. § 112

The Examiner has stated that "The specification does not explicitly disclose the target surface not required to have a pattern." On this basis, the Examiner has rejected claims 11-20 under the first and second paragraphs of 35 U.S.C. § 112. The language "wherein said target surface is not required to have a pattern" has been deleted from independent claim 11, rendering moot the rejections of claims 11-20 under the first and second paragraphs of 35 U.S.C. § 112.

III. Claim rejections under 35 U.S.C. § 102

A. Claims 21, 23, and 24

The Examiner has rejected claims 21, 23, and 24 under 35 U.S.C. § 102(b) over Piot (U.S. 6,256,016).

Independent claim 21 has been amended and now recites:

21. An optical navigation system, comprising:
 - a coherent light source operable to produce a coherent light beam for illuminating a target surface;
 - a first detector operable to produce first optical data in response to receipt of a first reflection of the coherent light beam from the target surface;
 - a second detector operable to produce second optical data in response to receipt of a second reflection of the coherent light beam from the target surface; and
 - a processor operable to determine from the first optical data a first displacement measure corresponding to a displacement of a pattern imaged by the first detector, determine from the second optical data a second displacement measure corresponding to a displacement of a pattern imaged by the second detector, and calculate a distance to the target surface from the first and second displacement measures.

Piot's optical detection system is able to detect displacements only in two dimensions (see, e.g., the description of the multi-resolution displacement detection system 605 in col. 12, line 66 - col. 13, line 53, and the description of its operation in col. 13, line 54 - col. 17, line 35). Piot's optical detection system does not include "a processor operable to determine from the first optical data a first displacement measure corresponding to a displacement of a pattern imaged by the first detector, determine from the second optical data a second displacement measure corresponding to a displacement of a pattern imaged by the second detector, and calculate a distance to the target surface from the first and second displacement measures," as now recited in claim 21.

For at least this reason, the Examiner's rejection of independent claim 21 under 35 U.S.C. § 102(b) over Piot now should be withdrawn.

Each of claims 23 and 24 incorporates the features of independent claim 21 and therefore is patentable over Piot for at least the same reasons explained above.

B. Claims 1, 5, and 8

The Examiner has rejected claims 1, 5, and 8 under 35 U.S.C. § 102(e) over Boillot (U.S. 6,730,926).

Independent claim 1 has been amended and now recites:

1. An optical navigation system, comprising:
 - a first light source operable to produce a coherent first light beam for illuminating a target surface;
 - a second light source operable to produce a second light beam for illuminating the target surface;
 - a first detector operable to produce first optical data in response to receipt of a reflection of the first light beam from the target surface;
 - a second detector operable to produce second optical data in response to receipt of a reflection of the second light beam from the target surface; and
 - a processor operable to determine from the first optical data a first displacement measure corresponding to a displacement of a pattern imaged by the first detector, determine from the second optical data a second displacement measure corresponding to a displacement of a pattern imaged by the second detector, and calculate a distance to the target surface from the first and second displacement measures.

Boillot's sensing head 10 includes a bi-dimensional sensor 13 and a tri-dimensional sensor 14. The bi-dimensional sensor 13 produces an image of a target object 30 from the illumination that is produced by a general illumination light source 20 (see, e.g., col. 3, lines 4-16). The tri-dimensional sensor 14 produces images of reflected laser stripes that are traced along respective lines across the object 30 (see, e.g., col. 3, lines 17-33). The sensing head 10 uses standard triangulation techniques to determine the range of the object along each of the traced laser lines (see, e.g., col. 3, lines 41-49). The sensing head 10 determines the position and orientation of the object 30 from the data that is generated by the bi-dimensional sensor 13 and the tri-dimensional sensor 14 (see, e.g., col. 1, lines 51-55). Each object position and orientation is determined from bi-dimensional and tri-dimensional data that is measured during a period when the bi-dimensional sensor 13 and the tri-dimensional sensor 14 are stationary in relation to the object 30.

Boillot's sensing head 10 does not determine from first optical data a first displacement measure corresponding to a displacement of a pattern imaged by a first detector, nor does it determine from second optical data a second displacement measure corresponding to a displacement of a pattern imaged by a second detector. Consequently, Boillot's sensing head 10 cannot possibly calculate a distance to the target surface from such first and second displacement measures.

For at least these reasons, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 102(e) over Boillot now should be withdrawn.

Each of claims 5 and 8 incorporates the features of independent claim 1 and therefore is patentable over Boillot for at least the same reasons explained above.

IV. Claim rejections under 35 U.S.C. § 103

A. Claims 3, 4, 6

The Examiner has rejected claims 3, 4, and 6 under 35 U.S.C. § 103(a) over Boillot.

Each of claims 3, 4, and 6 incorporates the features of independent claim 1 and therefore is patentable over Boillot for at least the same reasons explained above.

B. Claims 2 and 9

The Examiner has rejected claims 2 and 9 under 35 U.S.C. § 103(a) over Boillot in view of Piot.

Each of claims 2 and 9 incorporates the features of independent claim 1. As explained above, neither Boillot nor Piot teaches “a processor operable to determine from the first optical data a first displacement measure corresponding to a displacement of a pattern imaged by the first detector, determine from the second optical data a second displacement measure corresponding to a displacement of a pattern imaged by the second detector, and calculate a distance to the target surface from the first and second displacement measures,” as recited in claim 1. Therefore, claims 2 and 9 are patentable over Boillot and Piot for at least the same reasons explained above.

C. Claim 7

The Examiner has rejected claim 7 under 35 U.S.C. § 103(a) over Boillot in view of Tsunekuni (U.S. 4,712,100).

Claim 7 incorporates the features of independent claim 1. Tsunekuni does not make-up for the failure of Boillot to teach “a processor operable to determine from the first optical data a first displacement measure corresponding to a displacement of a pattern imaged by the first detector, determine from the second optical data a second displacement measure corresponding to a displacement of a pattern imaged by the second detector, and calculate a distance to the target surface from the first and second displacement measures,” as recited in claim 1. Indeed, the Examiner has cited Tsunekuni merely for the disclosure of “a lightpipe disposed between said target surface and said second detector...”

Therefore, claim 7 is patentable over Boillot and Tsunekuni for at least the same reasons explained above in connection with claim 1.

D. Claim 10

The Examiner has rejected claim 10 under 35 U.S.C. § 103(a) over Boillot in view of Dandliker (U.S. 5,907,152).

Claim 10 incorporates the features of independent claim 1. Dandliker does not make-up for the failure of Boillot to teach “a processor operable to determine from the first optical data a first displacement measure corresponding to a displacement of a pattern imaged by the first detector, determine from the second optical data a second displacement measure corresponding to a displacement of a pattern imaged by the second detector, and calculate a distance to the target surface from the first and second displacement measures,” as recited in

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claim 1. Indeed, the Examiner has cited Dandliker merely for the disclosure of "a detector comprising detector strips alternating with non detector strips..."

Therefore, claim 10 is patentable over Boillot and Dandliker for at least the same reasons explained above in connection with claim 1.

E. Claim 22

The Examiner has rejected claim 22 under 35 U.S.C. § 103(a) over Piot.

Claim 22 incorporates the features of independent claim 21 and therefore is patentable over Piot for at least the same reasons explained above.


V. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 50-3718.

Respectfully submitted,

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